



U.S. Department of  
Transportation

## Intelligent Transportation Systems Standards Fact Sheet



January 2000

### ASTM PS 111-98

## Specification for Dedicated Short Range Communication (DSRC) - Physical Layer Using Microwave in the 902 to 928 MHz Band

#### Overview

The standards for dedicated short range communication (DSRC) are intended to meet the requirements of applications that depend upon transferring information between vehicles and roadside devices, as defined in the National ITS Architecture. Typically, this type of communication links moving vehicles entering a communications zone with fixed roadside communication equipment. An example of where DSRC may be used is in toll collection areas where vehicle identity data can be relayed to toll collection authorities within the area surrounding a tollbooth. The applications for DSRC include advanced traveler information systems (ATIS), commercial vehicle operations (CVO), advanced vehicle control systems (AVCS), electronic toll and traffic management systems (ETTM), advanced public transportation systems (APTS), and advanced transportation management systems (ATMS).

To obtain a copy of this standard, please contact:

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#### What is this standard for?

This standard, **ASTM PS 111-98, Specification for Dedicated Short Range Communication (DSRC) - Physical Layer**, is comprised of the requirements for the physical, i.e., electrical and mechanical, interfaces and the transmission medium, i.e., air, in the 902 to 928 MHz location and monitoring service (LMS) band. This standard provides information for onboard equipment based on both active and backscatter technologies and allows for interoperability between systems based on either of these technologies. The standard allows for mixed time, frequency, and space division multiple access approaches, all similar to cellular telephone techniques allowing multiple users on a limited number of frequencies.

This standard contains requirements that minimize interference between neighboring sites and between active and backscatter systems. For active legacy systems, it defines the up link and down link frequency bands and adds the possibility of operating new down link center frequencies. For backscatter systems, it defines the up link and down link frequency while using power levels consistent with the out-of-band emissions requirements. To operate at the power levels allowed in this standard and minimize interference between systems and sites, specific frequency designations are made for both active and backscatter up link and down link operations.

#### Who uses it?

This standard is intended for equipment manufacturers, system integrators, toll and turnpike agencies, research consultants and other interested individuals and groups.

#### How is it used?

This standard is used for both wide area (multi-lane, open road) and lane-based applications to deliver messages between vehicles randomly entering a communications zone and roadside communication equipment. It also enables accurate and valid message delivery between moving or stationary vehicles and fixed or portable roadside communication equipment through an air interface. It does not include associated measurement guidelines for verification of the formulated requirements in this standard.

## Scope

This standard, **ASTM PS 111-98, Specification for Dedicated Short Range Communication (DSRC) - Physical Layer**, defines the open systems interconnection (OSI) layer 1 (physical layer) for dedicated short range communications (DSRC) equipment, operating in two-way, half duplex, active, and backscatter modes.

It establishes a common framework for the physical layer in the 902 to 928 MHz LMS band. This band is allocated for DSRC applications by the FCC in Title 47, Code of Federal Regulations (CFR), Part 90, Subpart M and by Industry Canada in the spectrum management, radio standard specification, location and monitoring service (902-928 MHz), RSS-137.

This standard provides requirements for the communication medium to be used for the exchange of information between roadside equipment (RSE) and on-board equipment (OBE). The RSE controls the protocol, schedules the activation of the OBE, reads from or writes to the OBE, and assures message delivery and validity. RSE is typically, but not necessarily, installed at a fixed location on the roadway. The OBE communicates with the RSE and is intended for, but not limited to, installation in or on a motor vehicle.

This standard is not for one specific ITS application, but rather describes a communication means to be used by any ITS application. It may also be used for any non-roadway environment that can utilize this type of dedicated short range radio communications.

## Related Documents

[ASTM PS 105-99—Standard Specification for Dedicated Short Range Communication \(DSRC\) Data Link Layer](#)

[IEEE Std 1455 - 1999—Standard for Message Sets for Vehicle/Roadside Communications](#)